Date: Fri, 19 Feb 93 18:37:59 PST
From: Info-Hams Mailing List and Newsgroup <info-hams@ucsd.edu>
Errors-To: Info-Hams-Errors@UCSD.Edu
Reply-To: Info-Hams@UCSD.Edu
Precedence: Bulk
Subject: Info-Hams Digest V93 #236
To: Info-Hams

Info-Hams Digest  Fri, 19 Feb 93  Volume 93 : Issue 236

Today's Topics:



Send Replies or notes for publication to: <Info-Hams@UCSD.Edu>
Send subscription requests to: <Info-Hams-REQUEST@UCSD.Edu>
Problems you can't solve otherwise to brian@ucsd.edu.

Archives of past issues of the Info-Hams Digest are available
(by FTP only) from UCSD.Edu in directory "mailarchives/info-hams".

We trust that readers are intelligent enough to realize that all text
herein consists of personal comments and does not represent the official
policies or positions of any party.  Your mileage may vary.  So there.
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Date: 19 Feb 93 15:50:46 EST
From: titan.ksc.nasa.gov!k4dii.ksc.nasa.gov!user@ames.arpa
Subject: 5/8 Wavelength Antenna Theory?
To: info-hams@ucsd.edu

In article <9302190813.A20222@sceng.ub.com>, thorburn@sceng.UB.COM
(Thorburn_Gary) wrote:
> Can someone briefly explain the theory behind a 5/8
> wavelength antenna; common for 2-meter mobile work.

Gary-

I'm not very good in the Antenna Theory department.  However, I recall the subject being mentioned in my Antennas class back in '69!

It seems that there are actually two antennas that each are called "5/8". These antennas have a vertical element working against a ground plane.

One is the true "5/8" wavelength.  Its claim to fame is that its feedpoint impedance has a 50 ohm resistive component, and a capacitive reactance component.  It can be fed with 50 ohm Co-Ax through an inductance whos reactance cancels the capacitive component.

The other "5/8" antenna actually has a 0.58 wavelength vertical element, rather than 0.625.  It is usually fed with a grounded, tapped coil:  the Co-Ax center conductor goes to the tap and the top of the coil goes to the vertical element.  Its claim to fame is the fact that it has the maximum signal toward the horizon, for a single element ground plane.  It seems that as the vertical element increases beyond a quarter wave, the major lobe swings down toward the horizon.  However, as the length increases further, another lobe appears in the direction of the top end of the element.  This lobe increases as the element length increases, subtracting from the power available for the lobe toward the horizon.  Thus, the maximum gain toward the horizon occurs when the element is 0.58 wavelength.

This latter 0.58 wave antenna is most frequently used in two meter mobile installations.  The former is frequently used in 440 MHz applications because of the simplicity of the antenna.  The lower end of the antenna rod can be wound into the small inductance needed at that frequency.

73, Fred, K4DII

fred-mckenzie@ksc.nasa.gov

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Date: 19 Feb 93 22:06:26 GMT
From: news.tek.com!tekig7!tekig6!royle@uunet.uu.net
Subject: 5/8 Wavelength Antenna Theory?
To: info-hams@ucsd.edu

>From: thorburn@sceng.UB.COM (Thorburn_Gary)

> Can someone briefly explain the theory behind a 5/8
> wavelength antenna; common for 2-meter mobile work.

> I have spent considerable time with the ARRL Antenna Book
> which describes how almost every other antenna works, but I
> can find almost nothing regarding the 5/8.

> 73 de  Gary  KB1AIF  thorburn@sceng.ub.com

Sorry this isn't brief. But at least it's true.

It's easiest to understand 5/8 wave antenna operation if we start with a perfect antenna. Imagine a short vertical over a perfect ground plane that goes on forever. If the vertical is shorter than 1/2 wavelength, the pattern will look like the top half of a bagel sliced and ready for the cream cheese. Maximum radiation will be right at the horizon, usually where we want it. Changing the antenna height from very, very short to 1/4 wavelength will make only a very small difference in pattern and gain. (The difference from infinitesimally short to 1/4 wavelength is less than 0.5 dB. This assumes a lossless antenna, though, which becomes a lousier and lousier approximation as the antenna gets shorter and shorter.) The changes in pattern and gain go together -- you can't have one without the other, since the way gain is achieved is by concentrating the energy by smashing the bagel.

As the length grows beyond 1/4 wavelength, the pattern begins changing more noticeably. The bagel begins flattening more noticeably, meaning that we have a thinner lobe, still pointed at the horizon. At a height of 1/2 wavelength, the gain has increased to 1.7 dB above that of a 1/4 wave radiator.

Beyond 1/2 wavelength, something else happens. A new lobe appears, with its maximum at 60 degrees above the horizon. This obviously is sucking away some of the energy we'd like to send toward the horizon. However, the original bagel (low lobe) continues to flatten as the antenna gets longer, and the gain in the direction of the horizon continues to increase until the antenna length is 5/8 wavelength. At this length, the gain at the horizon is very close to 3 dB relative to a 1/4 wave vertical. If we make the antenna longer than 5/8 wavelength, the high lobe gets too much energy and the lower lobe gets weaker.

Now, this is lots of fun but it ain't reality. Unless you live in the middle of the ocean (which is a reasonable approximation of the perfect ground plane). The rest of us are stuck with putting our vertical on or above a real ground, on top of a car, or some such situation that's far from perfect. So what happens then?

Well, if our antenna is mounted on or over real ground, we take a bad beating. Vertically-polarized waves bouncing from a real ground at low angles tend to nearly cancel the direct waves. The result is very bad attenuation of the signal at low angles. This effect gets worse as frequency increases and as the ground gets poorer. That nice lobe at the horizon gets attenuated about 20 dB! At 5 degrees above the horizon, the

loss is around 10 dB. You can't help this by putting down more radials, unless you can extend them many wavelengths beyond the antenna.

The 5/8 wave antenna has concentrated most of our energy just where it'll be attenuated the most, so it loses much of its advantage when placed over real ground. Here are some figures:

Advantage of 5/8 wave antenna over 1/4 wave, dB:

| | Elev. angle | Ground type |
|---|---|---|
| deg. | poor | average | very good |
| 0 | 4.5 | 4.5 | 4.5 |
| 5 | 0.7 | -0.6 | -0.2 |
| 10 | 1.9 | 0.7 | 0 |

So, there went our wonderful 3 dB gain. Oh, well, if we just spent a lot of time and money to more than double our antenna height, the placebo effect is sure to more than compensate.

Ok, what about putting the antenna on a car roof? I haven't tried to analyze this case in detail, but I'll refer you to a paper in the first volume of the ARRL Antenna Compendium. I'm sorry I don't have it here at work to refer to, but the article was written by someone at AEA, and had a title on the order of "The Great 5/8 Wavelength Antenna Myth". The conclusion was that 5/8 wavelength antennas also lose their advantage when placed on a ground plane which is less than several wavelengths in diameter. It is certain that low-angle radiation won't be made up of a direct field and a field reflected from the car top; the reflection will come from the surrounding ground and other objects.

While a 1/4 wavelength antenna will have a feedpoint impedance of around 36 ohms plus loss, and can be made resonant by slight shortening, the 5/8 wave antenna will have a feedpoint resistance of around 85 ohms with some capacitive reactance. A common matching method for the 5/8 wave antenna is to put an inductor from the base of the antenna to ground and connect the feedline between ground and a tap on the inductor.

Roy Lewallen, W7EL
ARRL Technical Advisor

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Date: Sat, 20 Feb 1993 00:54:45 GMT
From: sdd.hp.com!zaphod.mps.ohio-state.edu!rpi!cary115.its.rpi.edu!
mellob@network.UCSD.EDU
Subject: 5/8 waves
To: info-hams@ucsd.edu

O.K., I'm a little confused about 5/8 wave antenna's now.
So I'll ask a more specific question.

I recently constructed a 2 meter vertical antenna. It is tuned for
146.7 Mhz. (just because.) I made the radiating element 5/8's of
a wavelength long. I made four groundplanes, 1/4 wavelength long,
sloping 45 degrees from the horizontal, all at 90 degrees from
each other. (Take a moment to picture this before you respond please.)

Now my question is... Does this sound right?
And what is the theoretical feedpoint impedance of such an antenna?
(i have no may of measuring it) If such an antenna exists someplace
else otherthan on my roof.

I used it already, It works better than a rubber duckie but that
ain't sayin much!

-Brett Mellor
Rensselaer Polytechnic Institute
Troy, New York

mellob@rpi.edu

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Date: 19 Feb 93 21:29:19 GMT
From: news-mail-gateway@ucsd.edu
Subject: Bearing and Distance
To: info-hams@ucsd.edu

Somehow, my request for bearing and distance information
got re-posted.  (I didn't do it, honest, Officer!).
I have all the information that I need, thanks to several
helpful respondents to the _first_ posting.

Michael Owen W9IP

MROWEN@STLAWU

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Date: 19 Feb 1993 22:59:38 GMT
From: usc!zaphod.mps.ohio-state.edu!darwin.sura.net!mojo.eng.umd.edu!
chuck@network.UCSD.EDU
Subject: Cellular Safety
To: info-hams@ucsd.edu

In article <1993Feb17.153513.18447@cabot.balltown.cma.COM>
perley@cabot.balltown.cma.COM (Don Perley) writes:
>In article <Pine.3.05.9302151902.A5630-a100000@uafhp.uark.edu> Peter Laws
<plaws@uafhp.uark.edu> writes:
]
]]Another nit to pick: cell phones transmit all the time while the other 2
]]types of radio listed are intermittent.  Some kind of time measurement
]]should be listed to make the figures listed more useful (ie. W/kg/s).
]
]on the plus side, cell phones will automatically cut the power back
]when it's not needed.  You can reduce your exposure just by calling
]from good locations.

Yes, but when the power absorbed by your head makes the signal too weak
for the cell to hear, the cell will tell your radio to turn up its power.

900 Mhz really has no business being near your head,...or vice versa.

73,

Chuck Harris - WA3UQV
chuck@eng.umd.edu

---

Date: 20 Feb 93 01:59:44 GMT
From: news-mail-gateway@ucsd.edu
Subject: Delivery Failure Report
To: info-hams@ucsd.edu

From:    NAME: Mail Postmaster
     FUNC:
     TEL:                                  <POSTMASTER AT NEWPRTA1 at DOHENY at
TUS>
To:  "Info-Hams@UCSD.Edu"@DECWRL@MRGATE

    ALL-IN-1 was unable to deliver your message dated                    to

"green.richard"

- no such ALL-IN-1 account;

on node NEWPRT

The subject of the message was :
Info-Hams Digest V93 #230

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Date: Thu, 18 Feb 93 22:41:38 GMT
From: usc!howland.reston.ans.net!gatech!rpi!newsserver.pixel.kodak.com!laidbak!tellab5!balr!ttd.teradyne.com!news@network.UCSD.EDU
Subject: dilemma (to drill or not to drill)
To: info-hams@ucsd.edu

In article <MOSBROOK.93Feb16201248@beach.csulb.edu>, mosbrook@csulb.edu (Brent Mosbrook) writes:
> I just bought a new truck, and am itching to install my radio in it.. the
> problem is that I am debating about whether or not to drill a hole and put an
> antenna through the roof, or if I should just use a mag-mount.
> can anyone tell me what they have done to fill said hole once they sold the
> vehicle, and/or what the effects were on resale value?
> any new, innovative ideas regarding patching the hole if need be?
>

Brent,
These days, it's no problem. When you sell the truck, you replace the ham antenna with an Inexpensive Cell Phone antenna in the same hole and it shouldn't even be questioned.

---

John Rice - K9IJ | "Did I say that ?" I must have, but It was
rice@ttd.teradyne.com | MY opinion only, no one else's...Especially
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(708)-438-5065 - (bbs ) | Ex: K8YZR, KH6GHC, WB9CSP, W9MMB, WA1TXV

---

Date: Fri, 19 Feb 1993 20:51:59 GMT
From: sdd.hp.com!hp-cv!hp-pcd!hplsla!tomb@network.UCSD.EDU
Subject: FAA Radar power?
To: info-hams@ucsd.edu

biby@seas.gwu.edu (Rich Biby) writes:

>Yah, 7.5 Megawatts. But don't forget about gain!
>We were working against a zoning board regarding RF
>expsoure and had to check a couple of these things
>out completely. My mouth just hung open when I found
>out it was 6-some-odd Megawatts with about 25 dB gain!
>
>I think I would freek out if I was ever close enough
>to one to see it with my own eyes...

But of course, 25dB antenna gain means that there's a
lot of loss in most directions other than the one
the antenna is pointed.  Being _under_ one is probably
pretty safe.  But it wouldn't be prudent to stand in
front of the antenna...

---

Date: Fri, 19 Feb 1993 21:21:25 GMT
From: usc!howland.reston.ans.net!gatech!kd4nc!ke4zv!gary@network.UCSD.EDU
Subject: Info needed on OSCAR's
To: info-hams@ucsd.edu

In article <1993Feb19.115153.16437@usage.csd.unsw.OZ.AU>
jeice@newt.phys.unsw.edu.au (Jose Goicoechea) writes:
>Hi all!
>I have just been reading some old QST's that  I found in the Uni library and came
>across an article published in 1987 talking about OSCAR 25 years on.
>It mentioned that by 1991/92 there would be some new geostationary
>OSCAR.
>Now Does anybody know anything about this? and if so what/how would
>you work with? Could you use say an FT5200 transceiver?
>The article also said you might be able talk from Melbourne to Athens via
>the two satellites. Is this true?

This is AMSAT's Phase IV program. It's been put on hold due to a lack
of international support and excessive cost. Effort is being directed
instead at two other programs, a more powerful version of the Phase III
series, like Oscar 10 and 13, and the microsat series. A Phase IV satellite
could only cover one third of the globe while the other two series can
be reached from the entire globe, though not simultaneously. Amateur
satellites are by nature international creatures and insufficient support
for a North America centered geostationary satellite could be found.

Note that the microsat series are relatively inexpensive to build and
it's fairly easy to find them rides. They are 9 inch cubes and normally
ride in place of balancing ballast on multiple satellite launches.

Phase III birds are much more expensive to build, and have a more difficult time finding rides. A Phase IV bird would be most expensive to build and most difficult to find a ride. Both Phase III and IV birds have to find rides as *alternatives* to a major payload. This usually only happens when a new launcher varient is being tested. That's fairly rare.

Use of FM voice is discouraged on most all amateur satellites due to the excessive transponder power required to repeat the dead carrier present between words. The power of a linear transponder is shared among all it's simultaneous users and a strong carrier on the uplink can rob power from other signals on the transponder. More power efficient modes such as SSB and CW are encouraged.

The digital modes are used on the microsats, and permitted on a limited basis on Oscar 13 using PSK or FSK. Arsene will have an AFSK mode when it is launched, it will basically be a simple digipeater, that will allow use of FM radios in packet service. There is also a soft limiting FM transponder at S band on one satellite, but it sees limited use since S band equipment is not common.

Having a multimode radio is the best choice for working all the satellites in all their modes. You can press an FM transmitter into CW service, but you still need an SSB/CW receiver. This is a potentially cheap way to become active on Modes A and B however. A keyed FM transmitter can be used for uplink, on 145 MHz for Mode A or on 435 MHz for mode B, while a HF receiver can receive Mode A signals at 10 meters or a converter can be used in front of the receiver to hear 145 MHz downlink signals on mode B.

Gary
--


| | | |
|---|---|---|
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| Lawrenceville, GA 30244 | | |


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Date: 19 Feb 1993 21:07:50 GMT
From: usc!howland.reston.ans.net!sol.ctr.columbia.edu!hamblin.math.byu.edu!usenet@network.UCSD.EDU
Subject: kenwood
To: info-hams@ucsd.edu

I have dealt with radio company be4. I called the kenwood company to get a fuse cap for ts-520s. He said that it is 4.50(or something) + 5$ for shipping...
Does anyone know the better way to get the cap goes w/ fuse on the modet

ts-520s.

Or someone who is interested in/have to get some part from Kenwood who wish to share the cost of shipping....

thnx
tatsuya

---

Date: Fri, 19 Feb 1993 21:49:21 GMT
From: sdd.hp.com!zaphod.mps.ohio-state.edu!howland.reston.ans.net!gatech!wa4mei!ke4zv!gary@network.UCSD.EDU
Subject: Long Ground Lines
To: info-hams@ucsd.edu

In article <1993Feb19.173149.22446@ERA.COM> mark@ERA.COM (Mark Feit) writes:
>
>The other night I was pondering places to drive a ground rod in the
>house I'll be moving into next month, and hit upon an idea which would
>probably benefit from some net.wisdom:
>
>We're always told to make the path to ground as short as possible,
>presumably to keep whatever gets it there (wire, cold water pipe,
>etc.) from acting as a radiator.  My question is, why not use a length
>of coax and connect both the center conductor and shield on the ground
>end to the rod?  Would the shield catch any RF the center might
>radiate and drain it to ground?

Yes, this is an old trick to make non-radiating *safety* grounds.
It is not, however, a good way, in general, to establish a low
impedance *RF* ground. We want our ground cable to present a low
impedance to RF *at the radio*. This will only happen when the cable
is a very small fraction of a wavelength, or when it is a multiple
of an electrical halfwave. At other lengths, it presents a higher
complex impedance. Thus you see people talking about *resonating*
ground leads so as to have a low impedance path to ground. This
method has a drawback, however, the path is only low impedance at
the fundamental and *even* harmonics of the resonant frequency, it
is not low impedance for *odd* harmonics. A way around this is to
*parallel* multiple conductors of *different* lengths between the
radio and ground. That way, one of the conductors will be near
a resonant length for all RF components present on the transmitter
and will effectively short out all the other cable lengths.
Shielding those cables can prevent undesired ground lead radiation.
As you noted, the shield should be grounded *only* at the ground
rod. Otherwise the shield becomes a radiator.

On the other hand, a radio should *not* need a ground connection,
other than for electrical safety, if it is well shielded and operating
into a balanced antenna. There should be no RF currents on the outside
of the case. If there are, they are the result of undesired pickup
on the outside of the coax feeder and should be suppressed *there*
using a choke balun or the like. It's often difficult or impossible
to achieve this satisfactorily on a low band transmitter, or with
an unbalanced antenna such as a long wire or monopole, so good RF
grounding technique is encouraged.

There is yet *another* reason to establish a wideband low impedance
RF ground for your station. That is lightning protection. Lightning
is a step waveform and is rich in RF components reaching all the way
up to VHF. This energy must be offered a low impedance path to ground
to avoid damage to your equipment. Since DC to daylight low impedance
grounding is ordinarily very difficult, a different technique is
required. This is called the "ground window" approach. With this method,
*all* wiring entering or exiting the radio room, including power and
phone, must pass through a physically small area called the ground window.
At that point, all the cables must be effectively bypassed to a common
point, usually a copper or aluminum plate. That plate is then connected
to the system ground via a low impedance path. This way, any potentially
harmful voltages entering the hamshack are brought to a common potential.
While the radio and associated equipment may rise to thousands of volts
during a strike, *all* the equipment rises to the *same* potential and
no damaging currents can flow *through* the equipment.

Gary
--

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Lawrenceville, GA 30244 | |


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Date: Thu, 18 Feb 93 22:27:09 GMT
From: usc!howland.reston.ans.net!gatech!rpi!newsserver.pixel.kodak.com!laidbak!
tellab5!balr!ttd.teradyne.com!news@network.UCSD.EDU
Subject: NMO-Mount 10-meter ant.?
To: info-hams@ucsd.edu

In article <1993Feb16.081412.1092@miavx3.mid.muohio.edu>,
clmorgan@miavx3.mid.muohio.edu writes:
> In article <1993Feb15.143512.5217@mercury.cair.du.edu>,
awinterb@diana.cair.du.edu (Art Winterbauer) writes:
>> I have a permanently mounted NMO-type antenna for a couple of

>> Larsen 2-meter antennas.  Is there an NMO-type mount 10-meter
>> antenna?  Or is it time to punch another hole in the
>> ol' Toyota? :-)
>>
>>
>> --
>> Art Winterbauer  N0OQS
>> Internet:  awinterb@du.edu OR awinterb@diana.cair.du.edu
>> Packet:    n0oqs @ w0gvt.#neco.co.usa
>>
>
> Antenna Specialists, to name one, markets an adapter that will convert from
> the NMO mount to their line of ASP base-loaded antennae.  Then select an
> antenna (I think it the ASP-268 series) covering the 28MHz band, and you're
> in business.
>
> The antenna will handle 200W continuous carrier ... the bandwidth, however,
> will be less than you might like.  Perhaps in the range of 300KHz.  Remember,
> these antennae are designed for single-frequency applications ... not "boxes"
> with VFOs (anybody remember what a VFO is?) and 1700KHz to play in.
>

Also, I think Larsen makes them. Motorola sells 30-50Mhz Lo Band VHF antennas
for the NMO mount that I think used to be made by Larsen. These will tune down
to 29.6Mhz for 10Mtr FM. Don't know if they'll get down to 28.5 for SSB, but
I used one years ago on 10FM and it worked ok. (ie: it tuned up and radiated,
but wasn't very efficient).

--------


   John Rice -  K9IJ         |  "Did I say that ?" I must have, but It was
   rice@ttd.teradyne.com     |   MY opinion only, no one else's...Especially
   (708)-940-9000 - (work)   |   Not my Employer's.... Licensed since 1959
   (708)-438-5065 - (bbs )   |   Ex: K8YZR, KH6GHC, WB9CSP, W9MMB, WA1TXV


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Date: Fri, 19 Feb 1993 20:40:56 GMT
From: usc!howland.reston.ans.net!gatech!kd4nc!ke4zv!gary@network.UCSD.EDU
To: info-hams@ucsd.edu

References <1993Feb18.073301.27327@ke4zv.uucp>,
<1993Feb18.125124.21401@cbnewsj.cb.att.com>, <1m0lb1INNn6f@rave.larc.nasa.gov>
Reply-To : gary@ke4zv.UUCP (Gary Coffman)
Subject : Re: Bill Clinton and military surplus

In article <1m0lb1INNn6f@rave.larc.nasa.gov> zawodny@arbd0.larc.nasa.gov (Dr.

Joseph M Zawodny) writes:
>In article <1993Feb18.125124.21401@cbnewsj.cb.att.com> k2ph@cbnewsj.cb.att.com
(The QRPer) writes:
>>> Let's see, Clinton has 6 letters, Billary has 6 letters, does anyone
>>> know if Clinton's middle names have 6 letters? We all suspect him of
>>> being the anti-Christ, can we prove it?
>>
>>Clinton has 6 letters?!?  Billary has 6 letters?!?
>>
>>Is this the new math?  :-)
>
>It works just fine if you do not count the same letter twice clinton is a
>c, i, l, n, o, and t.
>
>Also, as an aside and comment on an earlier posting:
>I was going to let this go but, Gary (KE4ZV), isn't this a bit of a departure
>from your "normal" personality?  Must be a die-hard republican!  OH, no I can
>see it now - an onslaught.

Shhh! Be vewy vewy quiet, I'm hunting Democwats. hahahahahahhaha

Gary

--
Gary Coffman KE4ZV | You make it, | gatech!wa4mei!ke4zv!gary
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Lawrenceville, GA 30244 | |

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End of Info-Hams Digest V93 #236
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